

Canyon Disposition Initiative (CDI)

Deactivation and Decommissioning Focus Area
Midyear Review
May 27, 1999



Department of Energy
Richland Operations Office



Bechtel Hanford, Inc.
Environmental Restoration Contractor

Presentation Overview



Project Goals and Technical Approach



Relevancy



Technical Progress



Future Plans

Goal



***Provide a “Strategic Decision” for
the Permanent Disposition of Five
Chemical Processing Plants***

Purpose of the CDI



- Determine the ultimate disposition of the Hanford chemical processing (canyon) facilities
- Codify the decision through a CERCLA Record of Decision
- Five chemical processing facilities (S, T, U, B & PUREX) at Hanford
- Similar facilities at other DOE sites
- Hanford U-Plant is the “pilot” project

Canyon Facilities



PUREX



T Plant



U Plant

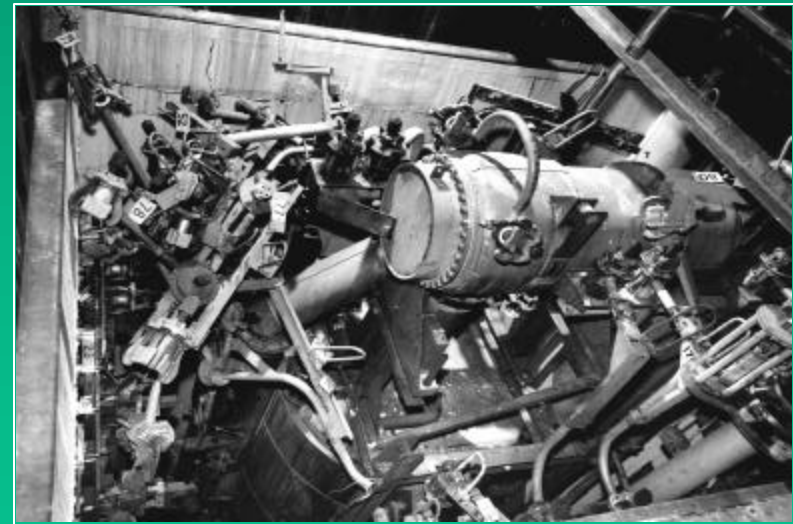


B Plant

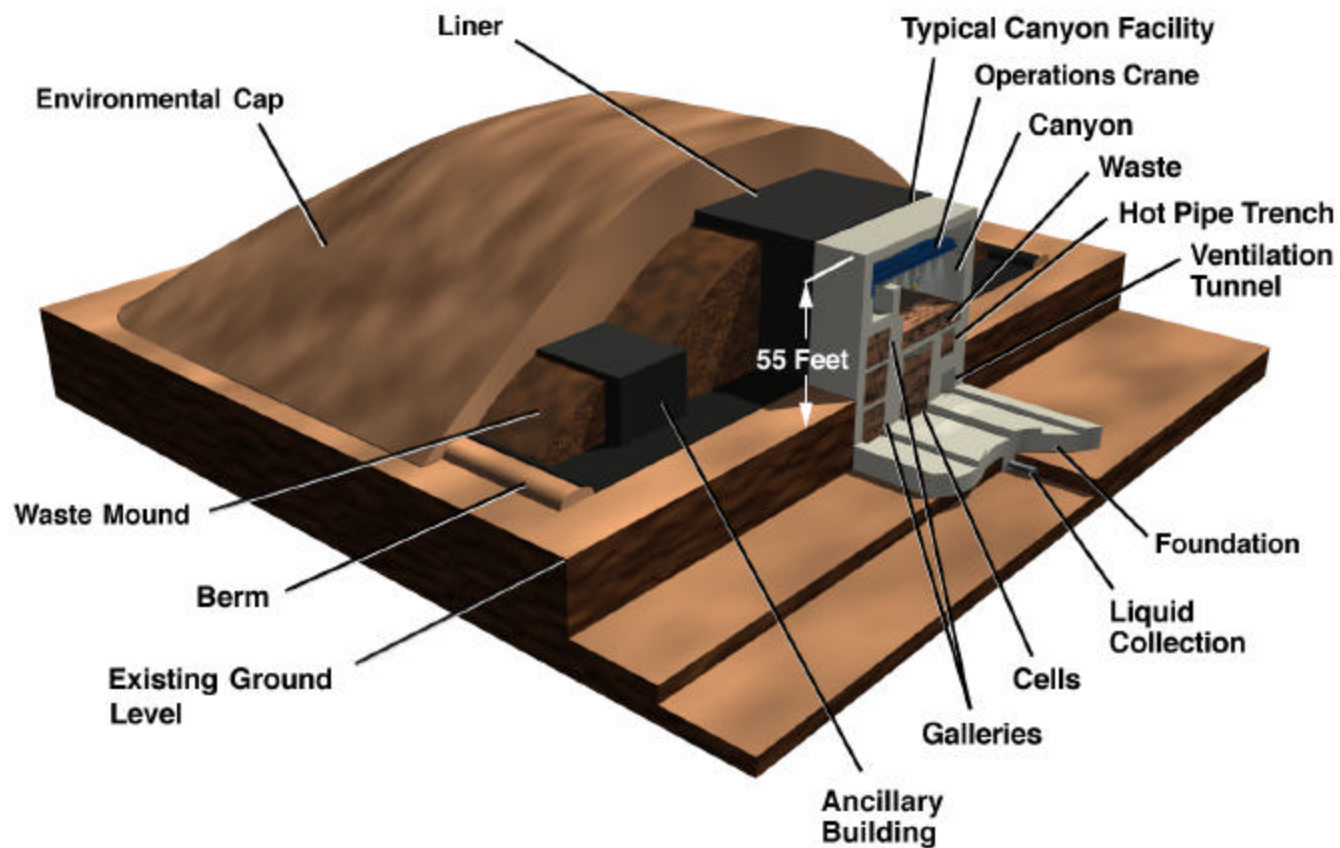


REDOX

U Plant Canyon Pilot



Conceptual Entombment Complex



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Consistent with Hanford Priorities:

- **Protect worker health and safety**
- **Eliminate most urgent risk**
- **Reduce mortgage and support costs**
- **Reduce generation of wastes**
- **Integrate waste treatment and disposal across the Site**
- **Create collaborative relations with Tribal Nations, Regulators and Shareholders**
- **Focus technology development on cost and risk reduction**



Benefits

- Opportunity to demonstrate partnering between EM-50 and other EM Programs
- Produce a decision on the canyon facilities
- Applicable to other facilities in DOE complex
- Potential saving of + \$1.1 Billion

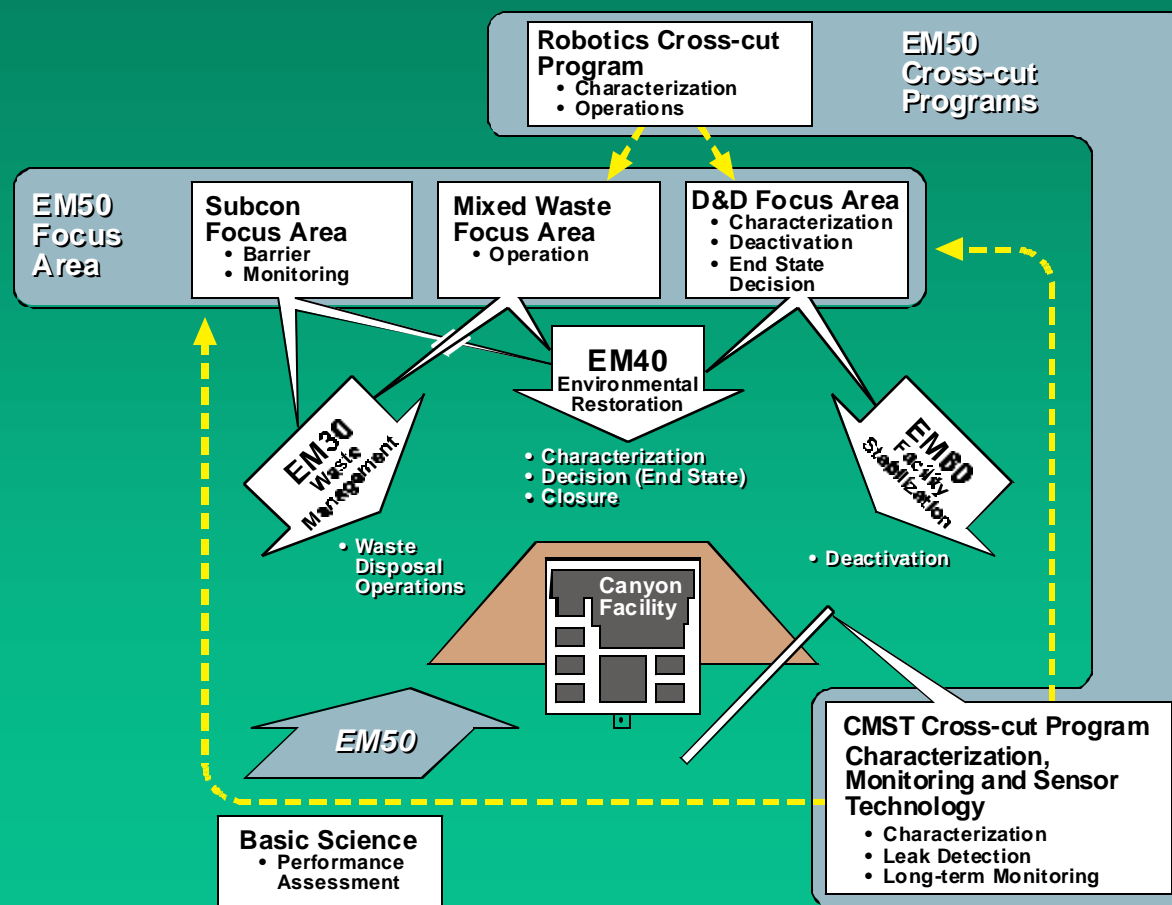
Partnering Approach



- **Partners**
 - DOE programs (EM30, 40, 50, 60)
 - Site Contractors (BHI, PHMC)
 - Regulators (EPA, State)
 - Tribal Nations (Nez Perce, Yakama, Umatilla)
 - Shareholders (Hanford Advisory Board)
- **Up front identification of issues**
- **Common support for CDI approach**
- **Agreed to decision method (CERCLA)**
- **Budget support early**

CDI Program Interaction

Criterion
1



Benefits All DOE EM Programs

EM-30

Waste Management

- Avoid construction of new waste disposal units
- Waste disposal units on-line sooner

EM-40

Environmental Restoration

- End state decision for canyon facilities
- Support Remedial Action decisions in 200 Area

EM-50

Science and Technology

- Involvement in project from beginning of decision process
- Platform for technology deployment

EM-60

Facility Stabilization

- Defined end state impact scope of deactivation for future facilities

Canyon Disposition Initiative (CDI) Major Milestones



Agreement-In-Principle
for Feasibility Study

Waste Disposal Facility
Operationally Ready



Prepare Complex



Facility Filled
with Waste



Waste
Complex
Filled and in
Post-Closure
Mode









Operate Complex

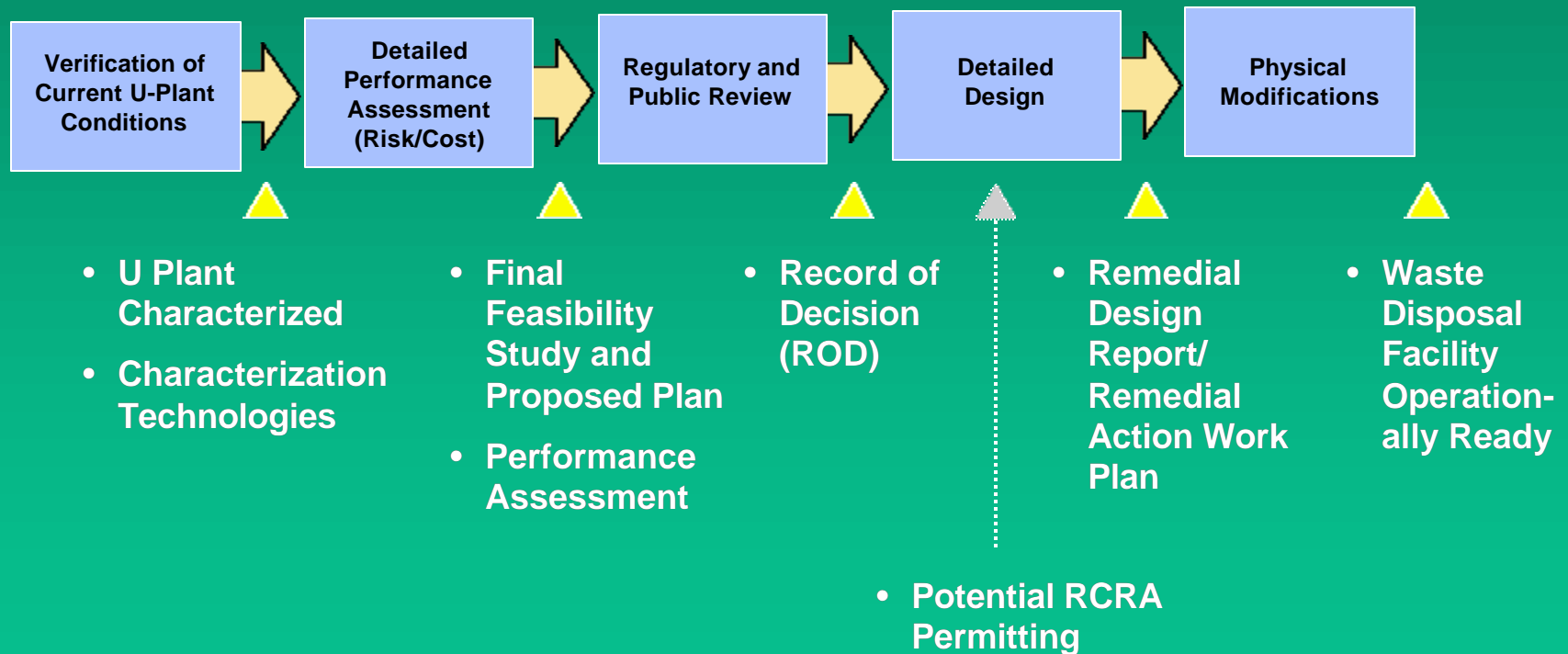


Close Complex



-  1 U-Plant Characterized
-  2 Record of Decision (ROD)
-  3 Start Physical Modifications
-  4 Start Waste Disposal
-  5 Start Installation of Final Environmental Barrier
-  6 Start Post Closure Surveillance

Prepare the Complex





Technology Integration Purpose



Support the successful characterization, performance assessment, and ultimate disposition of U-Plant through facilitating the deployment of the most efficient and effective technology.

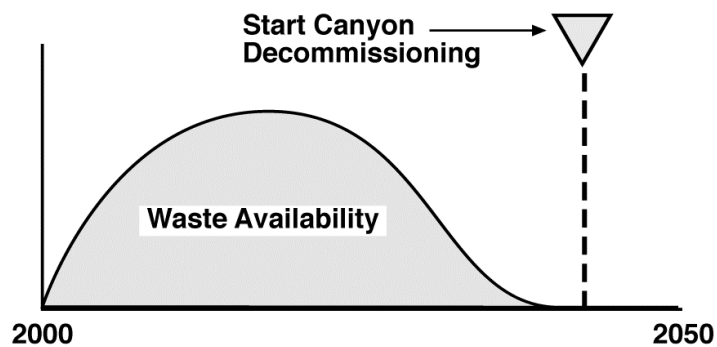
Technology Integration Scope



- Technology planning and overall coordination
- Project specific technology needs statements
- Identify, evaluate and recommend technology
- Support technology demonstration/deployment
- Report technology demonstrated/deployed

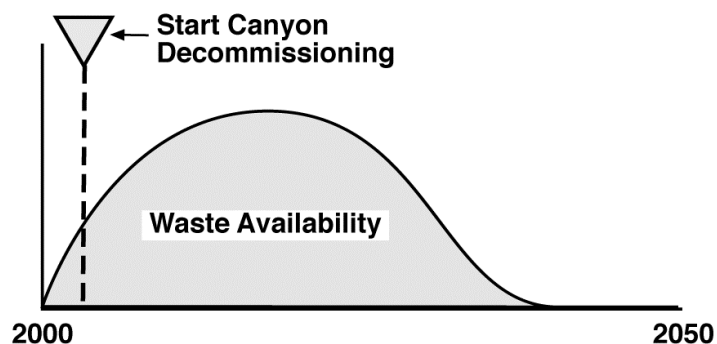
Timing is Crucial

Criterion
1



ER Baseline Case

- Miss Windows of Opportunity
- Increases Cost
- Collapse Structure / Entomb



Canyon Disposition Initiative

- Supports Other Cleanup Missions
- Reduces / Avoids Cost
- Asset vs. Liability

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Communicating Results

Criterion
1

Innovative
Technology
Summary
Reports

Fact
Sheets

Site
Exchanges

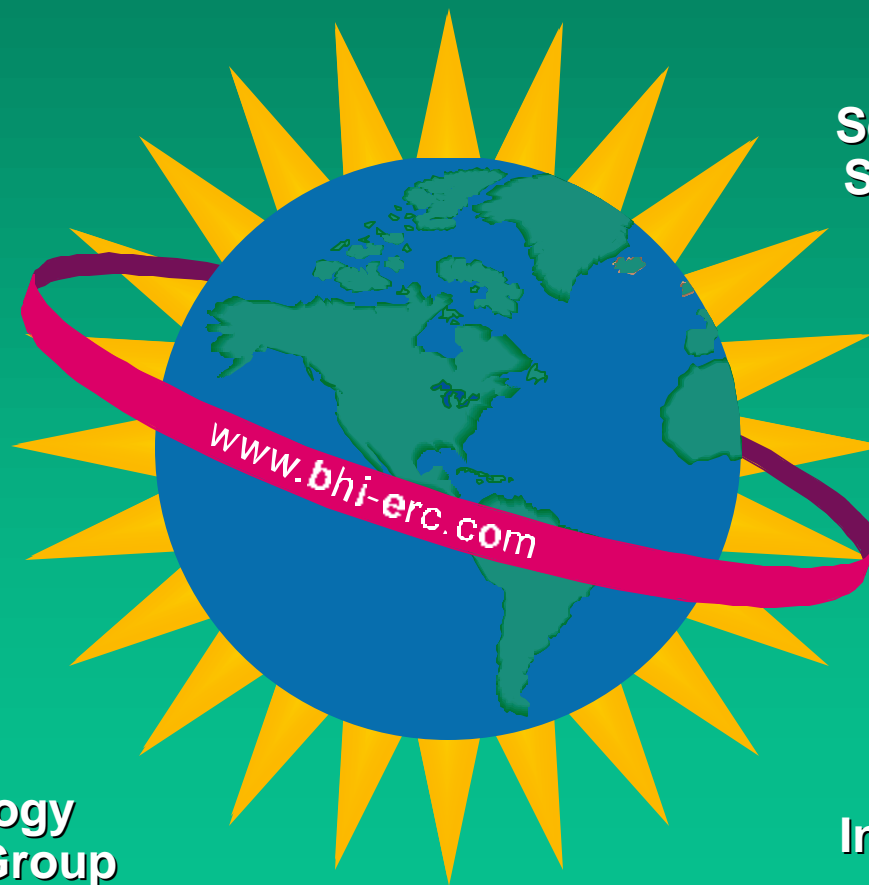
Technology
Working Group

Seminars and
Symposiums

Technical
Publications

Site
Technology
Coordination
Group

Internet



CDI Project Web Page

www.bhi-erc.com/canyon/canyon.htm

Hanford Site Technology Coordination Group CDI Characterization Technology Needs



FY99 (Old) No.	FY00 (New) No.	Need/Opportunity Title	FY99 Priority Ranking	FY00 Priority Rating	Need/ Opportunity Category
RL-DD034	RL-DD034	Remote/Robotic Technologies for CDI	High	1	Technology Need
RL-DD035	RL-DD035	Visual/Spatial Imaging for CDI	High	2	Technology Opportunity
RL-DD036	RL-DD036	Radiation Survey for CDI	High	2	Technology Opportunity
RL-DD037	RL-DD037	Liquids Detection for CDI	High	1	Technology Need
RL-DD038	RL-DD038	Liquids Characterization for CDI	High	2	Technology Opportunity
RL-DD039	RL-DD039	Solids (Sediment/Sludge/Dust) Characterization for CDI	High	2	Technology Opportunity
RL-DD040	RL-DD040	Concrete Characterization for CDI	High	2	Technology Opportunity

Hanford Site Technology Coordination Group CDI Engineering Technology Needs

Criterion
2

FY99 (Old) No.	FY00 (New) No.	Need/Opportunity Title	FY99 Priority Ranking	FY00 Priority Rating	Need/ Opportunity Category
NA	RL-DD048	Volume Reduction of Equipment for CDI	NA	2	Technology Opportunity
NA	RL-DD049	Waste Encapsulation and Stabilization for CDI	NA	2	Technology Opportunity
NA	RL-DD050	Sealant Technologies for CDI	NA	1	Technology Need
NA	RL-DD051	High Profile Surface Barrier for CDI	NA	1	Technology Need
NA	RL-DD052	Long-Term Monitoring for CDI	NA	2	Technology Opportunity
NA	RL-DD053	Operational Modeling for CDI	NA	3	Technology Opportunity

Other Sites' STCG Needs

Hanford Need #	Other Site Need #	Need/Opportunity Title
RL-DD034	ID-7.2.08	Robotics for D&D
RL-DD034	ID-7.2.18	General use remote tools that can handle small items such as pliers or hooking to rigging
RL-DD034	ID-7.2.19	Remote/robotic technologies for access and deployment of characterization and sampling tools
RL-DD034	CH-DD12-99	Standardized robotics tooling
RL-DD036	OH-F012	Improved facility survey techniques
RL-DD038 RL-DD039 RL-DD040	RF-DD02	High speed characterization system for (1) radioactive, (2) hazardous, and (3) toxic contamination

Other Sites' STCG Needs (cont'd)



Hanford Need #	Other Site Need #	Need/Opportunity Title
RL-DD039	RF-DD01	Improved pre-D&D characterization for distinguishing between transuranic and low levels of contamination
RL-DD039	SR99-4002	Characterization of contaminated surfaces
RL-DD040	SR99-4002	Characterization of contaminated surfaces
RL-DD040	NV10-9902-09S	Improved detection and characterization of radioactive contamination on large concrete and metal surfaces
RL-DD048	RF-DD11	Improved size reduction of contaminated equipment and demolition waste
RL-DD049	OH-F024	Void filling for burial

Technologies Selected for Deployment

Location	Task Description	Recommended Method/Technology
Process Areas	Remote Operation	Crane-mounted manipulator system
Tunnel Areas	Remote Operation	Robotic vehicles or crawlers
Drain Pipe	Remote Operation	Robotic vehicles or crawlers
Galleries and Process Areas	Determine presence or absence of free-standing liquid in equipment	Thermography, ultrasonics and/or radiography
Process Areas	Gamma Survey	Gamma imaging
Process Areas	Screening of equipment and piping for TRU	High-resolution gamma spectroscopy and/or screen for thermal neutrons
Process Areas	Concrete Core Samples	Coring system interfaced to manipulator for remote operation

Performance Characteristics and Advantages

Recommended Technology	Characteristics	Advantages
Crane-Mounted Manipulator	Robotic manipulator with multiple end-effectors capable of accomplishing various tasks including various characterization activities and volume reduction	<ul style="list-style-type: none">- Accomplish multiple tasks during all phases of the project- Remote operation to minimize worker exposure- Accomplish work in areas not accessible by workers
Robotic Vehicles or Crawlers	Remote characterization including video, radiation survey, and sample collection	<ul style="list-style-type: none">- Remote operation to minimize worker exposure- Accomplish work in areas not accessible by workers
Thermography, Ultrasonics, and/or Radiography	Detect free-standing liquids in equipment and piping	<ul style="list-style-type: none">- Non-intrusive, real-time characterization- Minimize worker exposure

Performance Characteristics and Advantages (cont'd)

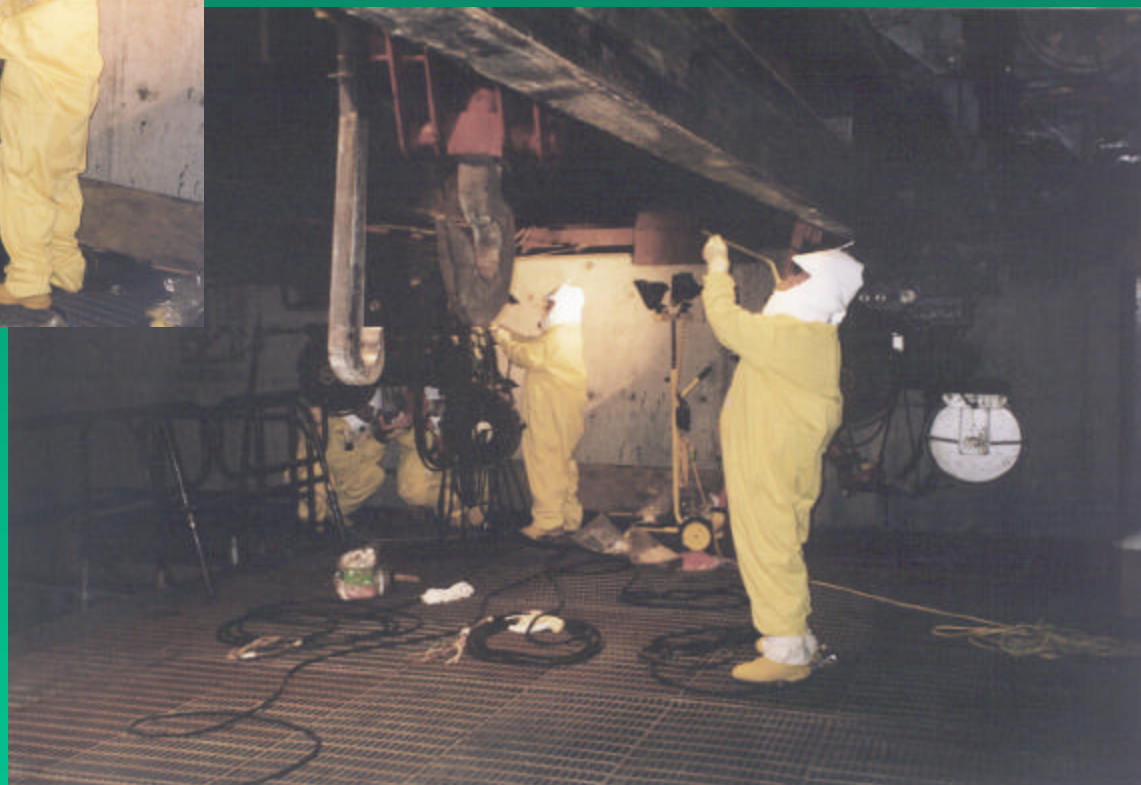
Recommended Technology	Characteristics	Advantages
Gamma Imaging	Identify location and intensity of gamma emitting radionuclides to screen out equipment from concern of TRU content	<ul style="list-style-type: none">- In situ characterization- Minimize worker exposure
High-Resolution Gamma Spectroscopy	Speciation of gamma emitting radionuclides to screen out equipment from concern of TRU content	<ul style="list-style-type: none">- In situ characterization- Minimize worker exposure
Remote Concrete Coring	Remote retrieval of concrete core from high radiation environment	<ul style="list-style-type: none">- Remote operation to minimize worker exposure- Accomplish work in areas not accessible by workers



Significant Results and Accomplishments

- Crane Upgrade
- Structural Sampling and Analysis
- Characterization Technology Activities
- Initial Rail Tunnel Characterization
- Opened Process Cell for Examination
- Installed Viewing Area in Canyon

Crane Upgrade



Crane Upgrade

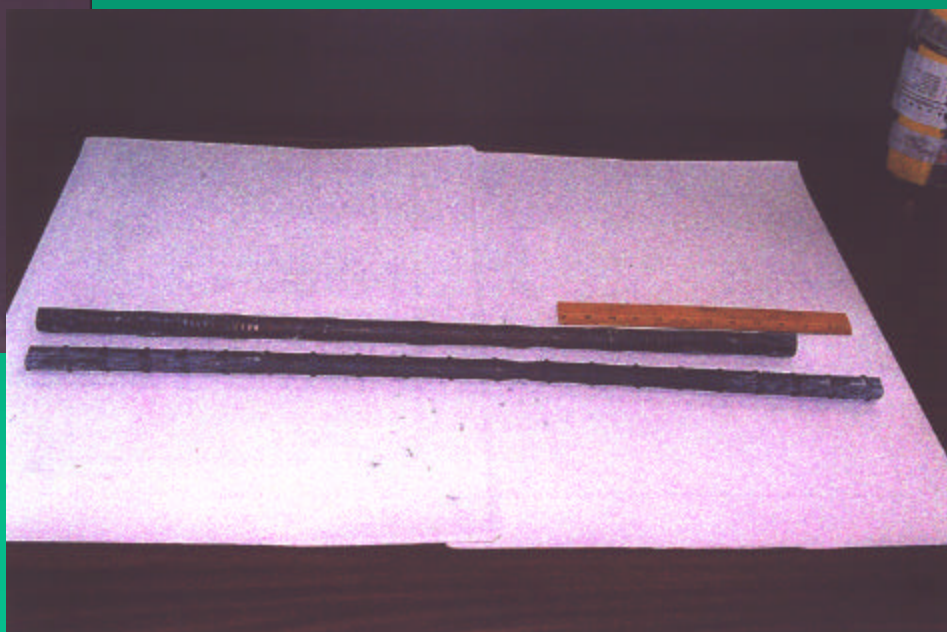


Structural Sampling



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Structural Sampling

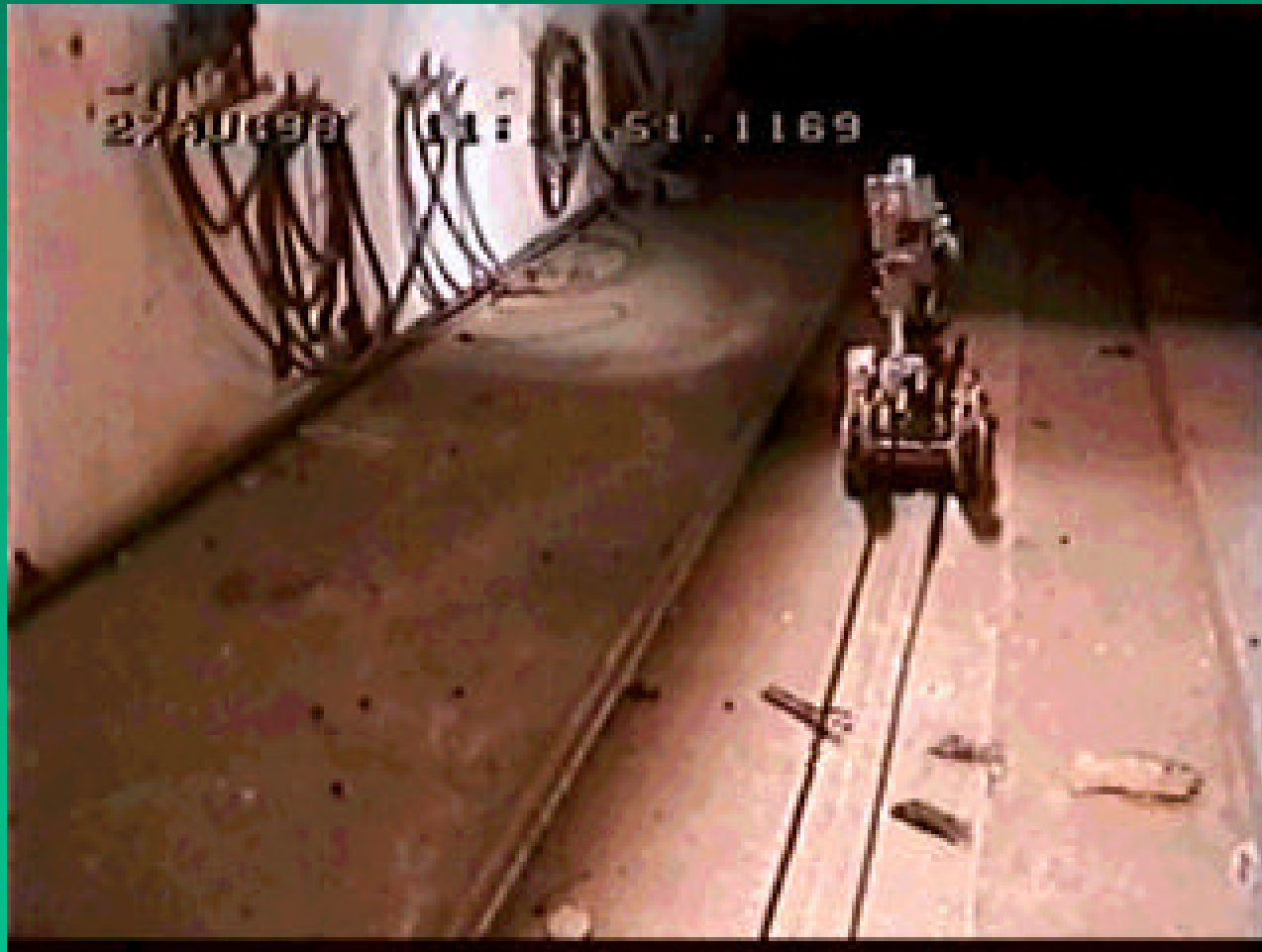




Characterization Technology

- Characterization Technology Needs Statements
- Characterization Technology Recommendations
- Characterization Technology Deployments
 - Andros Robot into Rail Tunnel
 - 3-D Gamma Imaging Technology

Rail Tunnel Characterization



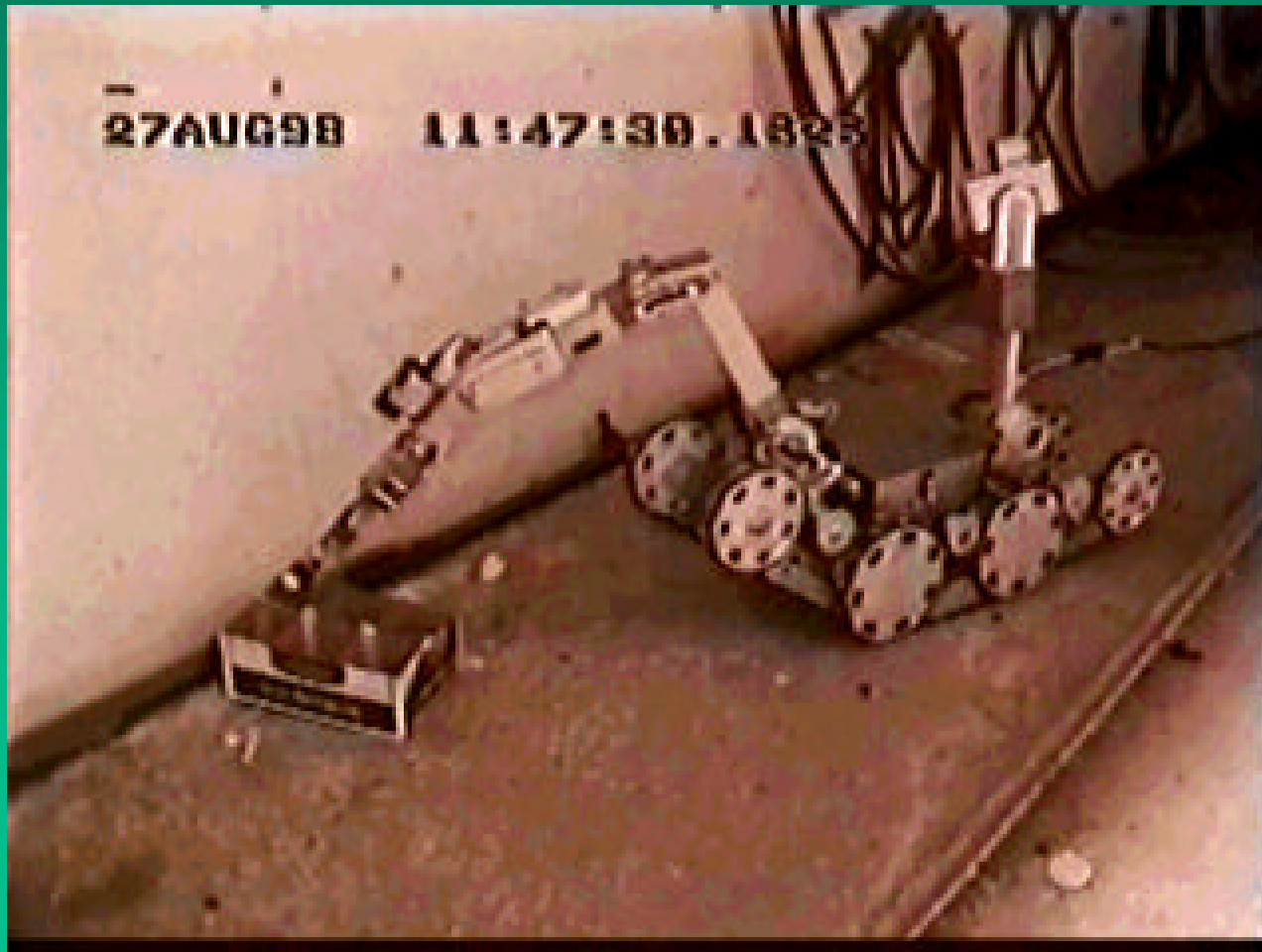
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Rail Tunnel Characterization



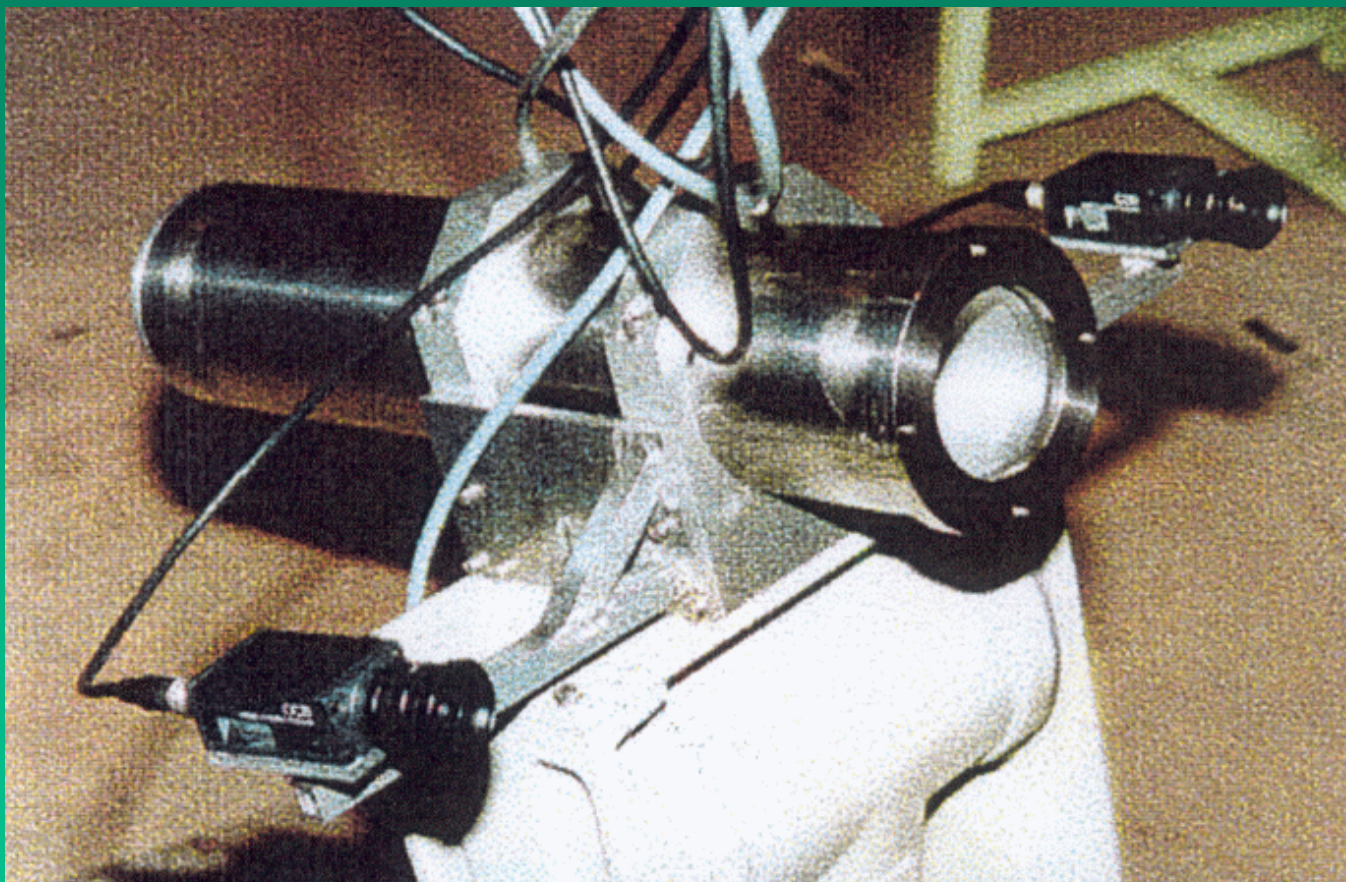
Rail Tunnel Characterization

Criterion
3

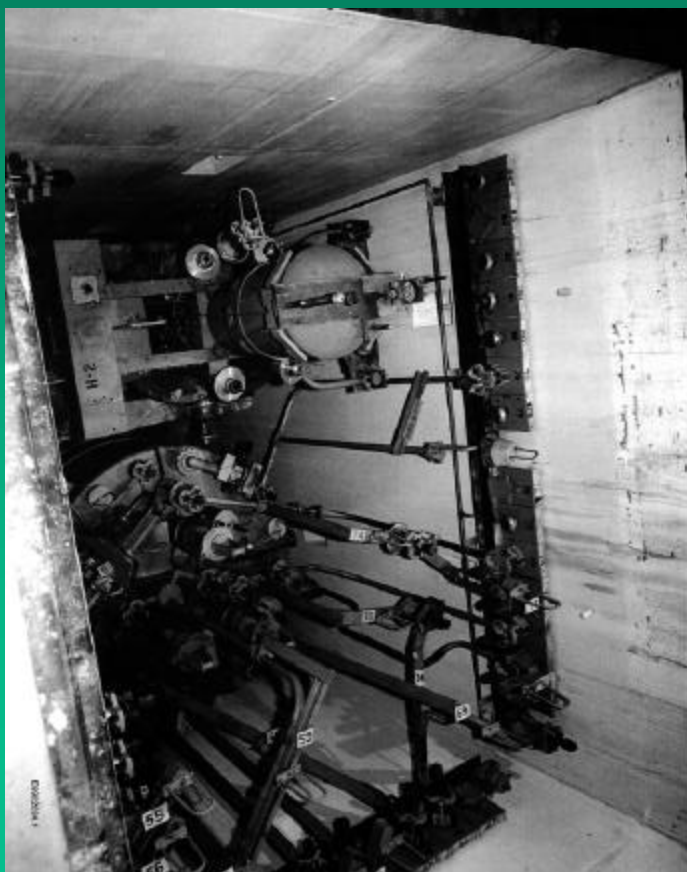


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3-D Gamma Imaging



Cell 28 Opening





Established Viewing Area (Bubble); Tours to Date Include:

- Site Senior Management
- Congressional Staffers
- Regulators
- HAB ER Committee
- EPA Headquarters Staff
- Tribal Cultural Staff
- D&D Focus Area Staff
- Tri-City Herald

Cost and Schedule Status

Cost Performance through April

	Reported	Actual
BCWS	356	356
BCWP	59	295
ACWP	45	281
SV	-297	-61
CV	14	14

- Completed engineering needs analysis on schedule
- Assessment of engineering technologies on schedule
- Deployment of characterization technologies delayed
- Schedule variance
 - Overstated due to joint funding account not yet being changed
 - Delay due to facility electrical upgrades
 - Delay due to PON opportunity

Schedule Status through April

Task Name	1st quarter			2nd quarter			3rd quarter			4th quarter		
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Complete Engineering Needs Analysis												
Complete Assessment of Engineering Technologies												
Demonstrate/Deploy Technology for Canyon Facility Characterization												

Progress Task



Path Forward for Project Completion

- **Complete Characterization per SAP**
- **Investigate Engineering Technologies**
- **Select Methodology and Conduct Performance Assessment**
- **Conduct Phase III Feasibility Study:**
 - **Detailed Analysis of Alternatives**
- **Record of Decision**
- **Public Involvement**



Remaining FY99 Scope

- Crane maintenance and S&M
- Access 3 cells for planning
- Characterization
 - Sump sampling
 - Piping survey and liquid detection
 - Canyon decking concrete sampling
 - RR tunnel concrete sampling
 - Canyon equipment survey and liquid detection



Remaining FY99 Scope (cont'd)

- Demonstrate/deploy technology for canyon facility characterization
 - Liquid detection
 - Gamma imaging
 - Radiation survey and screening
 - Ventilation tunnel characterization
- Complete assessment of engineering technologies



FY2000 Scope

- **Characterization of cells**
- **Characterization of hot pipe trench**
- **Characterization of drain pipe**
- **Characterization of any free-standing liquids detected**
- **Performance assessment**



CDI FY2000 Funding Requirements



- Continued EM Programs Integration
 - Site Contribution \$1,550K
 - EM-50 Contribution \$1,500K



CDI: Issues

- Commitment by all parties to support CDI Project to reach a Record of Decision (ROD)
- Robotics are necessary to complete characterization
- EM-50 technology opportunities past the ROD